Long Island Botanical Society

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Radical Changes in the Classification of Flowering Plants

Eric Lamont

Maples (*Acer*) are members of the Maple Family (Aceraceae), right? And elderberry (*Sambucus*) and arrow-wood (*Viburnum*), they're both members of the Honeysuckle Family (Caprifoliaceae), right?

How about butter-and-eggs (*Linaria vulgaris*), with its typical snapdragon flower, and turtlehead (*Chelone glabra*), and foxglove (*Digitalis purpurea*), and beard-tongue (*Penstemon* spp.), and European snapdragon (*Antirrhinum majus*); they're all members of the Snapdragon Family (Scrophulariaceae), right? Of course! They must be!

Well, I have news for you. These plants have been misunderstood all their lives, and now they have an identity crisis. They don't even know who their parents are anymore. What am I talking about? Let me try and explain, but it won't be easy. Our smartest botanists have been hard at work looking at plant DNA and other molecules, and playing overtime with computers; many also have been influenced by a philosophy called cladistics. And here's what they've apparently discovered:

Maples are no longer members of the Maple Family; they, along with horse-chestnut and buckeye, are actually members of the largely tropical Soapberry Family (Sapindaceae). And what about elderberry and arrow-wood? Well, they're members of the tiny Moschatel Family (Adoxaceae).

But butter-and-eggs, come on! It's gotta be a snapdragon, doesn't it? Nope! Get ready, this may be hard to swallow: butter-and-eggs, turtlehead, foxglove, beard-tongue, and European snapdragon are all actually members of the Plantain Family (Plantaginaceae). What?! You gotta be kidding; you mean those weedy species of *Plantago*? Yep! You got it.

*(See **Lamont** continued on page 3)*

Changes in Plant Classifications: Getting to the Crux of the Flux

Gerry Moore

Eric Lamont has highlighted a number of striking—and at times dizzying (at least to me)—changes that have recently been proposed in plant taxonomy. As I will try to explain, these changes are due not just to new data sources, such as nucleic acid (e.g., DNA) sequences, but also to a fundamental philosophical shift by some taxonomists regarding how plant classifications should be constructed—a shift that I suspect many traditional, field-oriented botanists will not fully embrace.

A group of taxonomists called cladists recognize only monophyletic groups or taxa (singular taxon; a taxon is simply any taxonomic group) above the rank of species. A **monophyletic taxon (clade)** is any group of organisms that includes a common ancestor and all of its descendants. A **paraphyletic taxon** is a group of organisms that includes a common ancestor and some but not all of its descendants. A **polyphyletic taxon** is a group of organisms that does not include the common ancestor of the included groups. These terms are further discussed and illustrated in Fig. 1 (page 6).

Taxonomists have generally rejected polyphyletic taxa. However, many taxonomists have either implicitly or explicitly recognized paraphyletic taxa. The shift by some in requiring a monophyly-only requirement for classifications means that monophyly must always be given primacy over degree of similarity, even when the two strongly conflict. As one paper authored by cladists (Cantino *et al.,* 1999) put it: "...a cladist would not give formal recognition to a clearly paraphyletic group even if it were separated by a large gap...." Therefore, no matter how distinct a group may be, it will not be recognized in a monophyly-only (i.e., cladis-

*(See **Moore** continued on page 5)*

Long Island Botanical Society

Founded: 1986 Incorporated: 1989

The Long Island Botanical Society is dedicated to the promotion of field botany and a greater understanding of the plants that grow wild on Long Island, New York.

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Society News

The election of officers was held at the November 8 meeting. All incumbents were reelected.

◆

LIBS President Eric Lamont reports that the membership renewals have been sent out and are coming in nicely, including one that included a $50 donation. Donations are always welcome!

◆

Members are urged to share in LIBS's traditional Members' Night on January 10. This is *your* chance to "show and tell"! Who recalls the time someone brought in a durian to taste? Please call Rich Kelly if you plan to participate this year.

◆

LIBS member Ann Carter announced that two internships are being offered by the Long Island Central Pine Barrens Commission, in cooperation with The Nature Conservancy, Long Island Weed Management Area. Interns will conduct field work for a six-month Invasive Plant Inventory and Assessment Project that begins in April. Applications are due February 28. More information can be found at: http://pb.state.ny.us/plc/internship_announcement_2005.pdf or by e-mail to keichelberger@pb.state.ny.us

◆

Anyone interested in assisting in a "big tree survey" should contact Margaret Conover.

◆

Long time LIBS member Elsa L'Hommedieu sent her greetings and wrote to report on the long list of botanical trips she completed in California in the past year.

◆

On the matter of the Grace Forest, LIBS member Andy Greller reports that the project has been halted, as a result of a lawsuit brought by the Long Island Pine Barrens Society and the North Shore Land Alliance. An article about the flora of this property, which Andy published in *Botanical Gazette*, in 1978, was the basis on which the suit succeeded, on the grounds of "irreparable damage or loss" to save what remains of this unique non-oak-dominated forest. The property in question is just east of New Hyde Park Road on land between the Northern Parkway and the Expressway.

◆

LIBS has registered a formal objection with DEC regarding the use of heavy machinery on high salt marshes in order to create open ponds.

◆

At the December 13 LIBS meeting, Skip Blanchard passed around copies of a 1991 LIBS newsletter in which Lois Lindberg was quoted as warning us about the possibility of invasion by mile-a-minute weed—14 years ago! Lois commented from the back of the room, "Don't say I didn't warn you!"

◆

See page 10 for members' recent plant sightings.

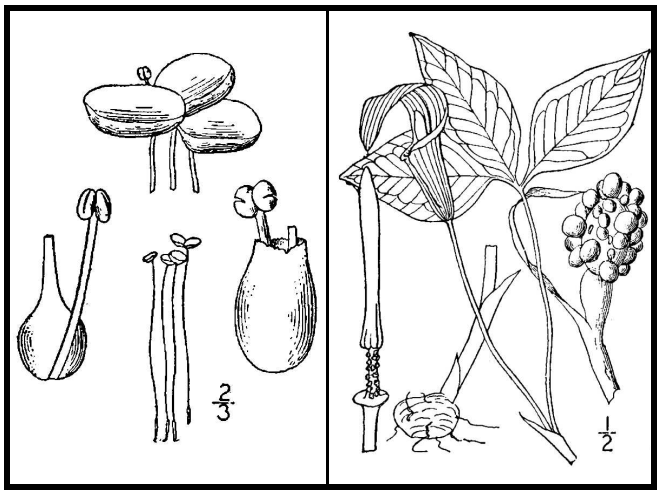
Lamont *(continued from page 1)*

Want to hear some more? Try these. Are you familiar with those little aquatic duckweeds in the genus *Lemna*? They're now in the same family as jack-in-the-pulpit (*Arisaema triphyllum*), the Arum Family (Araceae). Hackberry (*Celtis*) is no longer a member of the Elm family (Ulmaceae); it's either in the Indian Hemp Family (Cannabaceae) with marijuana (*Cannabis sativa*), or it should be placed in its own family, the Celtidaceae. Sweet-gum (*Liquidambar styraciflua*) is no longer in the Witch-hazel Family (Hamamelidaceae); it's in the Altingiaceae, a family centered in eastern Asia.

Had enough? Not yet? Here's another. Sandplain gerardia (*Agalinis acuta*) is one of New York's rarest plants. It has delicate, showy, pinkish-purple flowers and is a typical member of the Snapdragon Family. Oops, sorry! Try again. It's a member of the Broomrape Family (Orabanchaceae), along with cancer-root (*Orabanche uniflora*), squawroot (*Conopholis americana*), and beechdrops (*Epifagus virginiana*).

Now, I must confess that I'm not being completely fair, because historically many of these plant groups or taxa (singular taxon, defined as "any taxonomic entity, of whatever rank"; e.g., species, genus family, etc.) have been long considered to be "isolated fringe groups." That is, they have been thought to be related to another taxon (e.g., family or genus), but because the fringe group is so morphologically different from the majority of members in the other taxon, the fringe group has been maintained as a distinct family or genus. For example, even the most conservative botanists have recognized that the duckweeds (Lemnaceae) are related to and probably derived from the Araceae; but historically, botanists have tended to maintain separate families. Likewise, members of the Maple Family have been thought to be related to the Sapindaceae; and maple and horse-chestnut have been thought to be related to each other. But because of obvious morphological differences, traditional botanists have maintained three separate families.

Other fringe groups have been thought to be similar enough to the majority of individuals within a family, that they have been all lumped together. For example, the Elm Family has traditionally included two morphologically interconnected subfamilies, the Ulmoideae (including *Ulmus*, elm) and Celtidoideae (including *Celtis*, hackberry). The Honeysuckle Family has traditionally included *Sambucus* and *Viburnum*, even though they are morphologically different from other members of the family. And *Liquidambar* and *Altingia* have been long thought to form a fringe group within the Hamamelidaceae. Cladistic philosophy dictates, however, that these smaller groups be separated from the larger families, and some of these changes have not caused much controversy among traditional field botanists.



Why has duckweed (left) been placed in the same family as jack-in-the-pulpit (right)?

USDA-NRCS PLANTS Database / **Britton, N.L., and A. Brown. 1913. *Illustrated flora of the northern states and Canada*. Vol. 1: 442, 448.**

But other recent developments in plant taxonomy have been much more controversial and hard to swallow especially for traditional botanists. Among the most radically recircumscribed families are the Plantain Family and the Lopseed Family (Phrymaceae). Historically, the Plantain Family consisted of three genera of very unequal size: the familiar cosmopolitan genus *Plantago* with about 250 species; *Littorella*, with only three species; and monotypic *Bougueria*. Recently, the family has been greatly expanded to include about 120 genera! Many genera of the Snapdragon Family have been transferred to the Plantaginaceae, and the Waterstarwort Family (Callitrichaceae) also has been submerged into it.

Traditionally, the monotypic (a genus with only one species) genus *Phryma* has been included in the monogeneric (a family with only one genus) family Phrymaceae, the Lopseed Family. However, not all botanists have recognized the Phrymaceae as a distinct family, but have submerged it into the Verbenaceae, the Vervain Family. Recently, the Phrymaceae has gone from rags to riches; it has been radically circumscribed to now include about 20 genera and 240 species, including *Lindernia*, *Mazus*, and *Mimulus*, traditionally included in the Snapdragon Family.

Let's move on to another controversial family, the Lily Family (Liliaceae). Traditionally, the Lily Fam-

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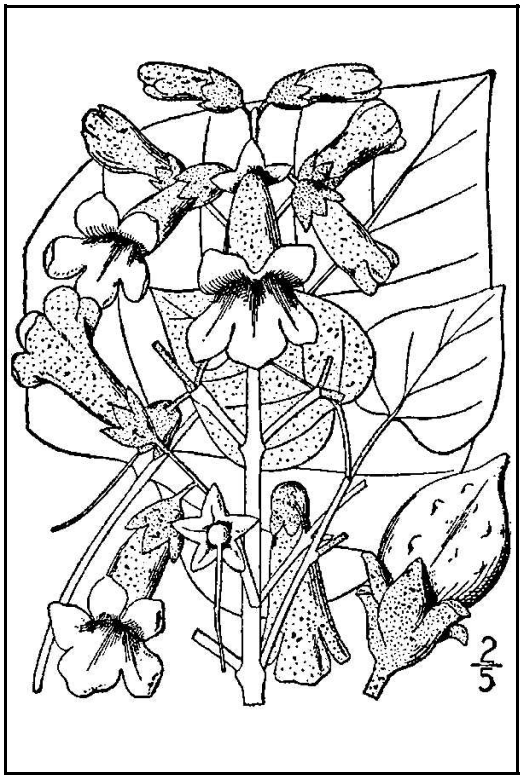
ily, as broadly defined, included about 280 genera and more than 4000 species. Today, many plant taxonomists support the extensive dismemberment of the traditionally defined Liliaceae, and in recent years the family has been split into more than 30 segregate families! Here is a short list of some of the more commonly accepted segregate families (with some representative genera): Alliaceae (*Allium*); Amaryllidaceae (*Narcissus*); Asparagaceae (*Asparagus*); Colchicaceae (*Uvularia*); Hemerocallidaceae (*Hemerocallis*); Hostaceae (*Hosta*); Hyacinthaceae (*Hyacinthus, Muscari, Ornithogalum*); Hypoxidaceae (*Hypoxis*); Melanthiaceae (*Veratrum, Zigadenus*); Nartheciaceae (*Aletris, Lophiola, Narthecium*); Ruscaceae (*Convallaria, Maianthemum, Polygonatum*); Smilacaceae (*Smilax*); and Trilliaceae (*Trillium*). Recognition of the Medeolaceae (*Clintonia, Medeola*) as a segregate family has been much debated, and recognition of the Convallariaceae has been recently supported by molecular studies. After the dust settles, it appears that the Liliaceae comprises only nine genera, including *Erythronium, Lilium, Streptopus,* and *Tulipa*, all restricted to the Northern Hemisphere.

Are you thoroughly confused yet? If not, here are 12 more examples of recent changes in plant classification of which every botanist should be aware:



Should we place empress-tree (*Paulownia*) in the Snapdragon Family or in the Trumpet Creeper Family? Perhaps neither?

USDA-NRCS PLANTS Database / **Britton, N.L., and A. Brown. 1913. *Illustrated flora of the northern states and Canada*. Vol. 3: 189.**

(1) There appears to be overwhelming evidence favoring the combination of the Milkweed Family (Asclepiadaceae) into the Dogbane Family (Apocynaceae).

(2) The Butterfly-bush Family (Buddlejaceae) is now included by some in the radically redefined and restructured Snapdragon Family (Scropulariaceae).

(3) Historically, the Dodder Family (Cuscutaceae) has been variously treated as a monogeneric family, or as a component of the Morning-glory Family (Convolvulaceae). Recent molecular evidence supports the treatment of *Cuscuta* as a derived member of the Convolvulaceae.

(4) Crowberry (*Empetrum*) has been traditionally placed in the Crowberry Family (Empetraceae). Many botanists have expressed doubt about the naturalness of the Empetraceae and its distinction from the Heath Family (Ericaceae). Molecular data have corroborated that concern, and shown *Empetrum* and the rest of the Empetraceae to be better included in a broader Ericaceae.

(5) There is universal agreement in resubmerging the Mimosa Family (Mimosaceae) and the Caesalpinia Family (Caesalpiniaceae) into the Legume Family (Fabaceae).

(6) The segregation of Indian Pipe (*Monotropa*) into the Indian Pipe Family (Monotropaceae) or its inclusion in the Heath Family (Ericaceae) has been controversial. Recent studies suggest that its inclusion in the Ericaceae is warranted.

(7) Ditch-stonecrop (*Penthorum*) has been variously placed in the Stonecrop Family (Crassulaceae), the Saxifrage Family (Saxifragaceae), or in the Ditch-stonecrop Family (Penthoraceae). Recent anatomical evidence suggests that *Penthorum* is best treated in a monogeneric Penthoraceae. Among those who do not favor a monotypic family, there is nearly evenly divided opinion between placement in the Crassulaceae and Saxifragaceae; this in itself perhaps supports segregation in the Penthoraceae. Molecular evidence supports the recognition of the Penthoraceae, and suggests closer affinities with the Water-milfoil Family (Haloragaceae) than with either the Crassulaceae or the Saxifragaceae.

(8) There has been disagreement over whether the empress-tree (*Paulownia*) is best placed in the Snapdragon Family (Scrophulariaceae), the Trumpet Creeper Family (Bignoniaceae), or its own Empress-tree Family (Paulowniaceae). Superficially, it closely resembles *Catalpa* of the Bignoniaceae, but some botanists have concluded that *Paulownia*'s affinities lie with the Scrophulariaceae, based on floral anatomy, embryo morphology, and seed morphology. Recent molecular studies provide evidence that *Paulownia* is best retained in its own family.

(9) The inclusion of shinleaf (*Pyrola*) in the Heath Family (Ericaceae) or its recognition as a separate family

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(Pyrolaceae) has been controversial. Recent studies suggest that it is best resubmerged in the Ericaceae.

(10) Water-pimpernel (*Samolus*) was previously generally treated as an aberrant component of the Primrose Family (Primulaceae). In order to create monophyletic groups, *Samolus* has been recently placed in the tropical Theophrasta Family (Theophrastaceae). However, *Samolus* remains aberrant in Theophrastaceae and is basal; it is probably best placed in its own Water-pimpernel Family, Samolaceae.

(11) The monogeneric Bur-reed Family (Sparganiaceae) is now included by some in the Cat-tail Family (Typhaceae).

(12) The Water-chestnut Family (Trapaceae) has been traditionally treated as a monogeneric family of one highly polymorphic or up to 15 or more narrowly defined species in the genus *Trapa*. The Trapaceae is now included by some in the Loosestrife Family (Lythraceae).

The examples discussed in this article are just a few of the many recently proposed changes in the classification of flowering plants. Changes are occurring so quickly that it's difficult to keep up. Are botanists getting any closer to an ideal system of plant classification? I'm not sure that we are. I may be too set in my ways, but for me, butter-and-eggs will always be a member of the Snapdragon Family! Sometimes we lose sight of the fact that all categories of classification above the species level are creations of the human mind and are subject to differences of opinion.

For a further discussion of the reasons behind these name changes, see Gerry Moore's article, beginning on page 1 of this issue.

Moore *(continued from page 1)*

tic) classification if it is paraphyletic. See Fig. 2 (page 7) for a hypothetical example of this problem.

This shift in philosophy has as much to do with the radical changes being proposed in plant taxonomy as it does with the new molecular data sets. I suspect that the new classifications that are causing the most frustration among field botanists are those that can be represented by Fig. 2. When field botanists are comparing plants in the wild they are not comparing their phylogenetic histories, but rather their relative similarities. Humans are hard-wired to consider degree of similarity (phenetic gaps) when classifying, and when things are classified in a manner that is contrary to their relative degrees of similarity, the classification will seem counterintuitive.

Members of the laurel genus *Kalmia* possess a number of unique floral character states (e.g., gamopetalous, saucer-shaped corolla, anthers fitted into corolla sacs in bud) that nicely diagnose the genus. However, recent evidence suggests that in order to avoid paraphyly, the two monospecific genera *Leiophyllum* and *Loiseluria* must be merged into *Kalmia* (Kron and King, 1996). Once this is done, the floral characters that were diagnostic for *Kalmia* are no longer so, as neither *Leiophyllum buxifolium* (=*Kalmia buxifolia*) nor *Loiseleuria procumbens* (=*Kalmia procumbens*) possesses these floral characters. *Loiseleuria* is gamopetalous, but it lacks corolla sacs; *Leiophyllum* is not even gamopetalous. It has long been suspected that these three genera were close phylogenetically—note their close positions in two frequently used field manuals (Fernald, 1950; Gleason and Cronquist, 1991)—but they have been maintained as separate genera due to their morphological dissimilarities. Other recent taxonomic cases that, to me, also seem to be counterintuitive include some aspects of the radical shifting proposed for the *Buddlejaceae*, *Callitrichaceae*, *Orobanchaceae*, *Phrymaceae*, *Plantaginaceae*, and *Scrophulariaceae*; merging the *Hippocastanaceae* and *Aceraceae* into the *Sapindaceae*; lumping the grass genus *Leptoloma* into *Digitaria;* and the merging of *Lemnaceae* into *Araceae*.

However, many changes in classifications to accommodate a monophyly requirement do not present difficulties when it comes to accommodating degree of similarity, and can even be an improvement. I have no problem merging the genera *Maianthemum* and *Smilacina* under the name *Maianthemum*. To me, the two are quite close, the latter simply being a smaller, 4-merous version of the former. The two's closeness can nicely be seen in Fernald's (1950) description of *Maianthemum:* "Perianth 4-parted, and stamens 4. Ovary 2-locular; stigma 2-lobed. Otherwise as in *Smilacina*." Likewise, I like the idea of moving *Liquidambar* (and the tropical tree genus *Altiginia*) into a separate family (Altiginiaceae), leaving our local flora with the type genus *Hamamelis* as the only representative of the Hamamelidaceae. Prior to this split, the genera included within Hamamelidaceae were quite disparate and by using simple morphology it was difficult to see how they should be placed in the same family. When I taught dendrology, students would often question the inclusion of *Hamamelis* and *Liquidambar* into one family, the dissimilarities of the two genera seemingly outweighing the similarities. When separated, the two families are easy to characterize, the Altiginiaceae having stipules on the petiole base, leaves spirally arranged, flowers with no

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perianth, and capsules arranged in a tight, globose head; the Hamamelidaceae having stipules attached to the stem, leaves two-ranked, perianth parts present, and capsules not arranged in globose heads. Other recent changes that seem to me to make good sense both from a phylogenetic as well as a phenetic grade sense include: transferring *Sambucus* and *Viburnum* out of Caprifoliaceae, the placement of Empetraceae *(Corema, Empetrum)* into Ericaceae, and the recognition of the genus *Nuttallanthus* (*Linaria canadensis)* as distinct from *Linaria* (e.g., *L. vulgaris*).

The opinions expressed above are just that—my opinions. Others will see it differently because a major problem of constructing classifications that include paraphyletic taxa is determining when to recognize a paraphyletic group; that is, how long must a branch be (i.e., how dissimilar) before it is carved out of the group? The example in Fig. 2 is an extreme example; what if lineage H's branch was longer but just slightly?

Recognizing only monophyletic taxa eliminates one having to make the arbitrary decision as to when the degree of modification in one lineage is so great that it warrants the recognition of a paraphyletic group. However, even if taxonomists were to agree on a monophyly-only approach to classification, this would not result in all taxonomists classifying organisms the same way. Cladograms (e.g., Fig. 1) are simply a hypothesis of the organisms' phylogeny. They do not represent *the* phylogeny of the organisms (unknowable without a time machine). Indeed, phylogenetic research on the same group of organisms can yield different results when different data sources or different methods of phylogenetic reconstruction are employed. Furthermore, even if there is an agreed upon phylogeny, taxonomists may disagree on how the classification is to be constructed. For example, one taxonomist may decide to achieve a monophyletic classification by splitting out a number of lineages (i.e., give these lineages separate names at the same rank), while another may achieve a monophyletic classification by lumping all the lineages under one name (see discussion in the Fig. 2 caption). In summary, the diversity one is seeing in our plant classifications is the result of the diversity of opinion among taxonomists on how classifications should be constructed

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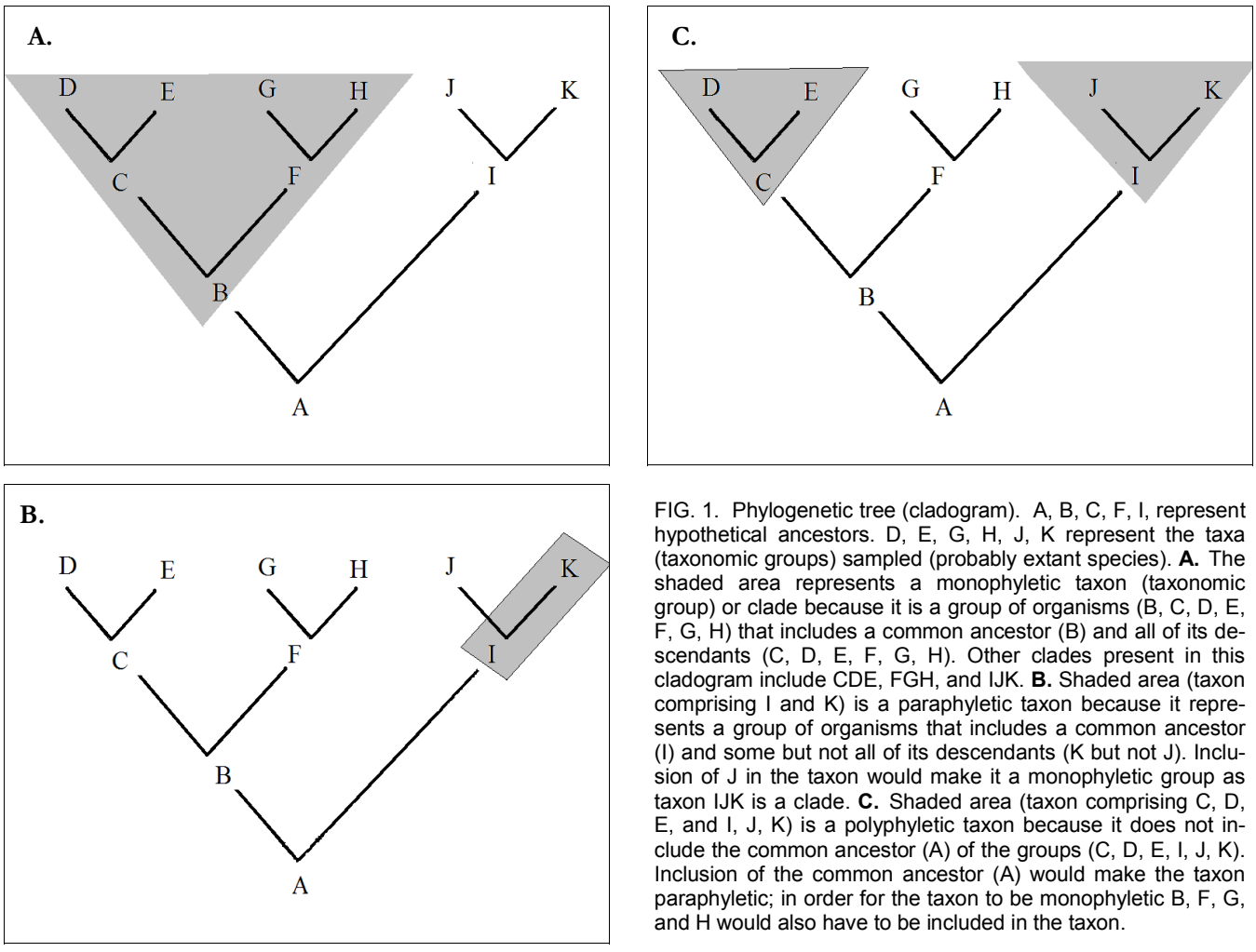

FIG. 1. Phylogenetic tree (cladogram). A, B, C, F, I, represent hypothetical ancestors. D, E, G, H, J, K represent the taxa (taxonomic groups) sampled (probably extant species). **A.** The shaded area represents a monophyletic taxon (taxonomic group) or clade because it is a group of organisms (B, C, D, E, F, G, H) that includes a common ancestor (B) and all of its descendants (C, D, E, F, G, H). Other clades present in this cladogram include CDE, FGH, and IJK. **B.** Shaded area (taxon comprising I and K) is a paraphyletic taxon because it represents a group of organisms that includes a common ancestor (I) and some but not all of its descendants (K but not J). Inclusion of J in the taxon would make it a monophyletic group as taxon IJK is a clade. **C.** Shaded area (taxon comprising C, D, E, and I, J, K) is a polyphyletic taxon because it does not include the common ancestor (A) of the groups (C, D, E, I, J, K). Inclusion of the common ancestor (A) would make the taxon paraphyletic; in order for the taxon to be monophyletic B, F, G, and H would also have to be included in the taxon.

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and how phylogenies should be reconstructed.

Plant taxonomy does have a single, universal system on how plants are to be named, and this is presented in the *International Code of Botanical Nomenclature* (Greuter *et al.,* 2000) (there is a small group of biologists that wants to abandon our current rank-based system of nomenclature and replace it with one that is solely based on phylogeny; see www.ohiou.edu/phylocode). However, the *International Code of Botanical Nomenclature* does not mandate how plants should be classified. Principal IV of the Code states, "Each taxonomic group with a particular circumscription, position, and rank can bear only one correct name...." Therefore, when there are disagreements regarding circumscription, position (working across a classification, such as determining in what genus a species should be placed), or rank (working up and down the classification; such as determining whether a taxon should be recognized as a family, subfamily, or tribe), different names may be applied to the same taxon. For example, sickle-leaved golden aster can go by the name *Chrysopsis falcata* or *Pityopsis falcata* depending on whether one circumscribes the genus *Chrysopsis* broadly or narrowly (with some members that were once placed in *Chrysopis* being placed in other genera such as *Pityopsis*).

These discrepancies can perhaps be put into perspective by looking at how people can disagree in classifications that occur in everyday life. A doctor may classify a patient as one who needs to have surgery in order to correct a problem; however, another doctor may classify that same patient as one who does not need surgery. I have had a number of students in class whom I classified as "B" students; however, they classified themselves as "A" students. Like the patient, but not like the students, those using plant names are always free to choose from among the competing classifications that best serve their needs. They are under no obligation to adopt the most recent revision of a group.

I know many feel as though they are drowning in all these new systems of classification that are now available. However, don't hold your breath waiting for plant taxonomists to develop a single, universally agreed-upon system of classification; if you do, you will surely suffocate.

Literature Cited

Cantino, P. D., S. J. Wagstaff, and R. G. Olmstead. 1999. "*Caryopteris* (Lamiacae) and the conflict between phylogenetic and pragmatic considerations in botanical nomenclature," Systematic Botany 23(3):369–386.

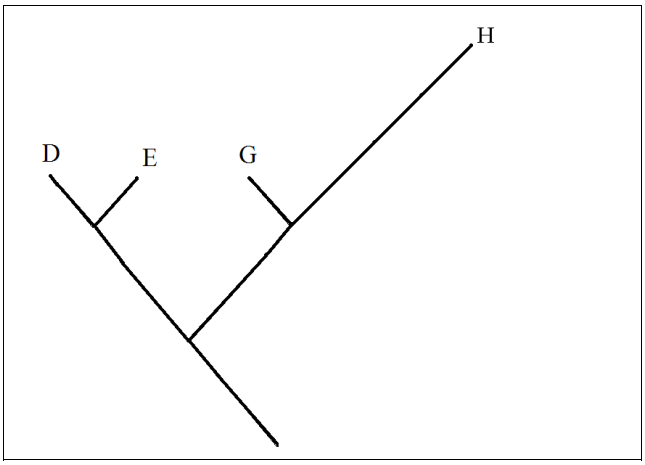

FIG. 2. Phylogenetic tree (hypothetical ancestors not shown). D, E, G, H represent sampled taxa (say species). Branch lengths represent degree of modification. Lineage H's long branch indicates that there is a significant phenetic gap between it and D, E, and G. Previously, species D, E, and G may have been placed in a genus while species H might have been placed in a monospecific genus due to its morphological distinctiveness. However, this taxonomy is not allowed under a monophyly-only approach because a taxon comprised of D, E, and G but exclusive of H is a paraphyletic taxon (G shares a more recent common ancestry with H than it does with D and E). In order to achieve a monophyletic classification there would have to be recognition of either: (1) a single genus comprised of D, E, G, and H; (2) two genera, one comprised of D and E, another of G and H; or (3) all four species (D, E, G, H) as four monospecific genera.

Fernald, M. L. 1950. *Gray's Manual of Botany,* 8th ed. (American Book Co., New York), 1632 pp.

Gleason, H. A. and A. Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada,* 2nd ed. (New York Botanical Garden, Bronx), 910 pp.

Greuter, W., J. McNeill, F. R. Barrie, H. M. Burdet, V. Demoulin, T. S. Filgueiras, D. H. Nicolson, P. C. Silva, J. E. Skog, P. Trehane, N. J. Turland, and D. L. Hawksworth. 2000. *International Code of Botanical Nomenclature* (Saint Louis Code) adopted by the Sixteenth International Botanical Congress, St. Louis, Missouri, July–August 1999. Regnum Veg. 138:1–474.

Kron, K. A. and J. M. King. 1996. "Cladistic relationships of *Kalmia, Leiophyllum,* and *Loiseleuria* (Phyllodoceae, Ericaceae) based on rbcL and nrITS data," Systematic Botany 21(1):17–29.

Gerry Moore is the director of the Department of Science at Brooklyn Botanic Garden. His research interests center on the taxonomy and nomenclature of vascular plants, particularly the northeastern United States.

Summary of Recent Generic Changes in our Native Composites

Eric Lamont

How many different species of *Aster* occur on Long Island? The last time I counted, there were about 30 (see Table 1).

But many 21st-century botanists are telling me that I can't count. Based upon new evidence, including DNA studies, and a relatively new philosophy called cladistics, they claim that there are no true asters on Long Island. That's right, ZERO!

Certainly, there must be some mistake. All of us are familiar with those delicate autumn wildflowers that add splashes of white, purple, and blue to our meadows and roadsides. Nope, say the cladists. They claim that the only true asters in the genus *Aster* occur across the Atlantic in the Old World.

So, what are we supposed to call all those species that used to be called *Aster*? No problem, those species are now placed in the genera *Doellingeria, Eurybia, Ionactis, Oclemena, Sericocarpus*, and *Symphyotrichum* (Table 1).

Have you ever seen golden ragwort (*Senecio aureus*) on Long Island? In his 1899 *Flora of Long Island*, Smith Ely Jelliffe reported it as "common throughout the island," but today it's a rare treat to find this showy spring wildflower. Anyhow, the cladists claim that

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TABLE 1. A list of the asters of Long Island, New York.

TRADITIONAL SCIENTIFIC NAME	COMMON NAME	MOST RECENTLY PROPOSED SCIENTIFIC NAME
Aster acuminatus	Whorled Aster	*Oclemena acuminata*
Aster concolor	Eastern Silvery Aster	*Symphyotrichum concolor*
Aster cordifolius	Blue Wood Aster	*Symphyotrichum cordifolium*
Aster divaricatus	White Wood Aster	*Eurybia divaricata*
Aster dumosus	Long-stalked Aster	*Symphyotrichum dumosum*
Aster ericoides	Heath Aster	*Symphyotrichum ericoides*
Aster firmus	Shining Aster	*Symphyotrichum firmum*
Aster infirmus	Cornel-leaved Aster	*Doellingeria infirma*
Aster laevis	Smooth Blue Aster	*Symphyotrichum laeve*
Aster lanceolatus	Eastern Lined Aster	*Symphyotrichum lanceolatum*
Aster lateriflorus	Calico Aster	*Symphyotrichum lateriflorum*
Aster linariifolius	Stiff-leaved Aster	*Ionactis linariifolia*
Aster lowrieanus	Lowrie's Blue Wood Aster	*Symphyotrichum lowrieanum*
Aster macrophyllus	Bigleaf Aster	*Eurybia macrophylla*
Aster nemoralis	Bog Aster	*Oclemena nemoralis*
Aster novae-angliae	New England Aster	*Symphyotrichum novae-angliae*
Aster novi-belgii	New York Aster	*Symphyotrichum novi-belgii*
Aster patens	Clasping Aster	*Symphyotrichum patens*
Aster paternus	Toothed White-topped Aster	*Sericocarpus asteroides*
Aster pilosus	Awl Aster	*Symphyotrichum pilosum*
Aster praealtus	Willow Aster	*Symphyotrichum praealtum*
Aster puniceus	Purple-stemmed Aster	*Symphyotrichum puniceum*
Aster racemosus	Small White Aster	*Symphyotrichum racemosum*
Aster radula	Swamp Aster	*Eurybia radula*
Aster schreberi	Schreber's Aster	*Eurybia schreberi*
Aster solidagineus	Flax-leaf White-topped Aster	*Sericocarpus linifolius*
Aster spectabilis	Showy Aster	*Eurybia spectabilis*
Aster subulatus	Annual Saltmarsh Aster	*Symphyotrichum subulatum*
Aster tenuifolius	Perennial Saltmarsh Aster	*Symphyotrichum tenuifolium*
Aster umbellatus	Flat-topped Aster	*Doellingeria umbellata*
Aster undulatus	Wavy-leaf Aster	*Symphyotrichum undulatum*

(Continued from page 8)

golden ragwort is no longer a true member of the genus *Senecio*; rather, it should be placed in the genus *Packera* (*Packera aurea*).

Sweet everlasting (*Gnaphalium obtusifolium*) is a common Long Island wildflower that cladists have transferred to the genus *Pseudognaphalium*, and its cousin, the rare purple everlasting (*Gnaphalium purpureum*) has been transferred to the genus *Gamochaeta*.

One of our rarest goldenrods, the stiff-leaf goldenrod (*Solidago rigida*), has been transferred to the genus *Oligoneuron*.

White snakeroot (*Eupatorium rugosum*) is a plant associated with rich woodlands on Long Island's north shore. This species has been shown to be the cause of the "milk sickness" of pioneer days; the plants contain a poison that is transmissible to humans through cow's milk. Recent DNA evidence suggests that white snakeroot should be transferred to the genus *Ageratina*. Usually, the new name would be *Ageratina rugosa*, but that name is preoccupied (that is, the name already is being used for another species). Therefore, the oldest name available (in the genus *Ageratina*) for our white snakeroot is *Ageratina altissima*.

Are you familiar with the Joe-pye-weeds in the genus *Eupatorium*? We have three species on Long Island: three-nerved Joe-pye-weed (*E. dubium*), hollow-stem Joe-pye-weed (*E. fistulosum*), and purple-node Joe-pye-weed (*E. purpureum*). Reports of spotted Joe-pye-weed (*E. maculatum*) from Long Island are based upon misidentifications of *E. dubium*. In 1970, Robert King and Harold Robinson from the Smithsonian Institute proposed a new genus for the Joe-pye-weeds, *Eupatoriadelphus* (meaning, "brother of *Eupatorium*"). But in 1987, King and Robinson changed their minds and returned the Joe-pye-weeds to *Eupatorium*. In 1999 and 2000, Edward Schilling and colleagues from the University of Tennessee took a close look at DNA from Joe-pye-weeds and concluded that they really did not belong in the genus *Eupatorium*, and returned them to *Eupatoriadelphus*. To further complicate the story, in 1836 the French botanist Constantine Rafinesque proposed the genus *Eutrochium* for the Joe-pye-weeds, but neither King and Robinson nor Schilling *et al.* were aware of this earlier name when they originally transferred species into *Eupatoriadelphus*. When I was asked to write the *Flora of North America* treatment for the Joe-pye-weeds, I had to transfer all of the species into the genus *Eutrochium*. Although DNA evidence confirms that the Joe-pye-weeds are different from the *eupatoriums*, the data can be interpreted in different ways, leaving the possibility that the Joe-pye-weeds should actually remain in the genus *Eupatorium*.

Poinsettia

David R. Hershey, Ph.D.

Every Christmas, the myth resurfaces that poinsettia (*Euphorbia pulcherrima*) is a poisonous plant. Parents with young children sometimes do not even buy poinsettias because they're afraid their children might be get sick.

Poinsettia's poisonous reputation apparently originated in 1919 when a child in Hawaii was erroneously reported to have died from eating the plant. Researchers at Ohio State and other universities have found poinsettia is not poisonous when fed to rats, and the American Medical Association has found either no toxic effect or occasional vomiting induced by children who ate poinsettia. The plant does not contain the poisonous diterpenes found in some species in the Euphorb Family.

Poinsettia is the number one potted flowering plant sold in the U.S. Even though it is sold only during the Christmas holidays, it outsells plants, such as chrysanthemum, that are sold year round. If poinsettia was capable of causing death if eaten, common sense indicates that the government would require a warning label. The Consumer Products Safety Commission refused to require a warning label due to lack of evidence that poinsettia is poisonous.

A few other Christmas plants *are* potentially fatal if eaten. Mistletoe (*Phoradendron spp.*) contains a toxic lectin, phoratoxin. Eating the mistletoe berries is the usual cause of poisoning. The fruits of holly (*Ilex spp.*) contain poisonous saponins. The bulbs of paperwhite narcissus and amaryllis (*Hippeastrum spp.*) contain poisonous alkaloids.

There are many common plants that can cause death. The leaf blades of rhubarb have killed people yet rhubarb is widely grown for its edible petioles. The castor bean plant (*Ricinus communis*) is grown as an ornamental and a source of castor oil. Its seeds contain the lectin, ricin, one of the most toxic poisons. Poinsettia is not sold as an edible plant. Its leaves and bracts do not taste good, but eating a few would not kill a person.

David R. Hershey, Ph.D., is a biology education consultant and has published over three dozen teaching articles in science teaching journals. You can view his list of publications at http://www.angelfire.com/ab6/hershey/bio.htm

INVASIVE PLANT NOTES

Marilyn Jordan, Ph.D.
The Nature Conservancy on Long Island

***Trapa natans* (water chestnut)**. First confirmed occurrence on Long Island in Mill Pond, Wantagh, Nassau County. Hand-pulling to be done spring 2006. We need to be fully proactive in eradicating this aggressive invasive before it can spread.

***Myriophyllum spicatum* (Eurasian water milfoil)**. Found and confirmed by Scott Kishbaugh, DEC Albany, in North and South Twin Lakes, Wantagh. First confirmed occurrence in Nassau or Suffolk Counties that I know of. Not much we can do to control this plant.

***Salix cinerea* (European gray willow)**. Widespread in New England and three New York counties. Reported by Tom Rawinski (Forest Service, NH) and confirmed by Gerry Moore at the Brooklyn Botanic Garden (gerrymoore@bbg.org). Gerry would appreciate specimens suspected to be *S. cinerea*. A threat to rare wetland plants.

***Impatiens glandulifera* (Himalayan balsam; Ornamental jewelweed)**. Reported in a talk at the IPANE Weed Summit (Framingham, MA, September 2005) by Nava Tabak. For pictures go to http://webapps.lib.uconn.edu/ipane/search.cfm and select *Impatiens gladulifera*.

More info about known established invaders:

***Phellodendron amurense* (Amur cork-tree)**. Ornamental spreading in Massachusetts with the potential to spread over long distances and compete with natives. Reported in a talk at the IPANE Weed Summit (Framingham, MA, September 2005) by Lou Wagner. Invasive potential supported by Tim Wenskus, NYC Parks.

***Aralia elata* (Japanese angelica)**. Confirmed by Gerry Moore, Brooklyn Botanic Garden, who reports: "The woody *Aralia* in our area is *Aralia elata* and it is terribly invasive. The species was previously confused with the native *Aralia spinosa*, which occurs south of the New York City metro area." From Ann Rhoads, Morris Arboretum of the University of Pennsylvania: "The inflorescence of *A. spinosa* has a distinct central axis whereas that of *A. elata* branches from very close to the base."

Please report suspected new occurrences of these species to me and also to Kathy Schwager.

Plant Sightings

Erratum: The reported sighting of mile-a-minute weed at Whelan Field in Malverne (LIBS Vol. 15, No. 4, page 30) was erroneous.

◆

At the William Cullen Bryant Park preserve in Roslyn on October 1, LIBS members observed bitternut hickories (*Carya cordiformis),* American beech (*Fagus grandifolia*), and black walnuts*, (Juglans nigra)*, as well as a magnificent field of showy goldenrod *(Solidago speciosa)* and smooth aster (*Aster laevis)*. In addition, many huge arboretum specialties were growing there: *Torreya, Cedrus, Catalpa, Paulownia,* osage orange, Kentucky coffee tree, *Evodia*, and huge pines.

◆

On October 29, Ray Welch led a LIBS field trip to the "Gamma Forest" at the Brookhaven National Laboratory in Upton. Members viewed the devastated area bombarded for 17 years by gamma rays. The site, abandoned for 20 years, is slowly experiencing succession with much of the damaged area a Pennsylvania sedge meadow. A circular grove of pitch pines has developed on the central core, terrain made sterile by the most intense radiation nearest the source, but pines have failed to establish slightly farther from the central area, where the sedges survived the irradiation.

◆

On an *ad hoc* LIBS field trip to Kings Point on November 5, Andy Greller, Skip and Jane Blanchard, Rich Kelly, Barbara Conolly, Joanne Tow, and Helen McClure identified 100 plant species, including the following: *Euonymus americanus* (hearts-a-bustin'), *Betula nigra* (river birch; cultivated), and *Woodwardia areolata* (netted chain fern; in profusion).

◆

Zu Proly reported a stand of water hyacinth in the northwest corner of Mill Pond in Oyster Bay.

◆

Rich and Skip recently rediscovered a stand of silvery spleenwort in Caleb Smith Park after an absence of reports for the last 20 years.

The Flora of Long Island Project

Submitted by the Flora Committee

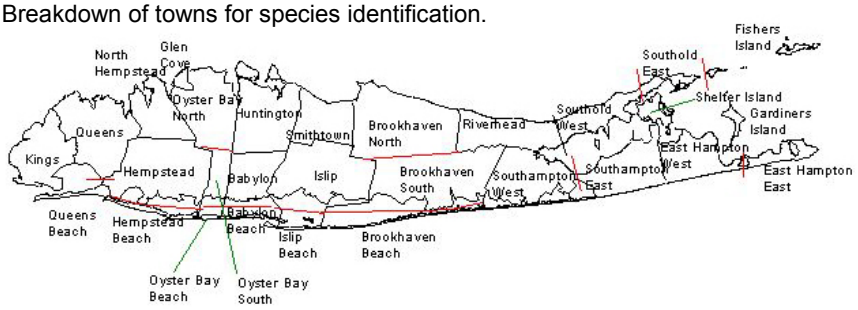
Project History

The Flora Committee began meeting soon after LIBS was formed in the late 1980s. The initial impetus was to capture location information on rare plants that was being held in various people's gray matter. These meetings concentrated on a few families, Orchids, Scrophs, etc.

Beginning in 1989, a more formal process was begun, which involved meeting every fourth Tuesday, from 7 to 9 p.m. at the Planting Fields Library, where we had access to their books and herbarium information, but occasionally at other places. At each meeting we marched through species, beginning with ferns and culminating in orchids. Assuming we worked nine days a year over 15 years, we averaged about 18 species a night.

For each species we discussed the taxonomy, and recorded what information we had on the towns the species occurred in, distinguishing between historical records (pre-1980) and current records, and between observations, literature, and specimen-based records. Some of the larger towns were broken down into smaller, comparable units (see map).

Breakdown of towns for species identification.



Those who contributed to this process include: Skip Blanchard, Barbara Conolly, Carol Johnston, Al Lindberg, Lois Lindberg , Betty Lotowycz , Joe Beitel, Steve Clemants, with participation of Tom Delendick, Andy Greller, Jane Hoar, Rich Kelly, Eric Lamont, Chris Mangels, Vince Puglisi, and Bob Zaremba.

Over the years, several portions of the preliminary atlas were published in the Long Island Botanical Society Newsletter: Ferns & Fern Allies, (1994, Vol. 4, No. 3), Gymnosperms (1995, Vol. 5, No. 3) Magnoliideae (1996, Vol. 6, No. 6) Ranunculaceae (1997, Vol. 7, No. 6) Berberidaceae (1998, Vol. 8, No. 7), Platanaceae through Myricaceae (1999, Vol. 9, No. 5), Fagaceae (2001, Vol. 11, No.1), and Betulaceae through Cactaceae (2002, Vol. 12, No. 1).

Current Status of the Project

We have recently completed the first run through the entire flora and have published a preliminary draft atlas. The draft atlas is 351 pages long, with 10 distribution maps on each page. Families are arranged taxonomically and genera within them are arranged alphabetically.

The results of the preliminary atlas show 2489 species in 164 families of vascular plants growing on Long Island. Seventy-six percent of these species are native.

Review copies of the draft atlas have been distributed and we are now in the process of revising and updating based on new data. (After 15 years we certainly hope there are new data.) We also plan a trip to the New York State Museum to fill in missing historic data.

9 October 2005

To the Editor:

Enjoyed, if that's the word, Ray Welch's article on the two species of bittersweet (*Celastrus*), and his account of the near total disappearance of our native species, *C. scandens* (LIBS Quarterly Newsletter, 2005, Vol. 15, No. 4, 32–34). He mentions never having seen it "anywhere."

During approximately 10 years of fairly intensive botanical searching throughout the northeastern states, I have only *once* come upon this myself. On 21 September 2001, we had a satisfactory identification of *C. scandens* at Cape May, New Jersey, and noted the characteristic leaves and the terminal fruit clusters. It was growing along the westernmost trail at Higbee Beach Wildlife Management Area.

Since then, the increasing proliferation of both porcelain-berry and *Clematis terniflora*—which seem to be smothering even the *orbiculata*!—makes it unlikely to be found again.

Guy Tudor
Forest Hills, New York

P.S. That horrid, big infestation of mile-a-minute vine out on Narrow River Road, Orient, has *not* abated.

P.P.S. Stop water chestnut now! (You ought to see the Hudson River way up in Columbia County.)

Upcoming Programs

January 10, 2006* Tuesday, 7:30 p.m.
MEMBERS' NIGHT
Members are invited to bring slides, stories, specimens, and tales of peculiar sightings of favorite plants. A great opportunity to show what you have found while exploring on Long Island or elsewhere. Please call Rich Kelly in advance to advise as to the approximate number of slides/images that you would like to show. Thanks.
Location: Bill Paterson Nature Center
Muttontown Preserve, East Norwich

February 14, 2006* Tuesday, 7:30 p.m.
SCOTT KISHBAUGH: "INVASIVE AQUATIC PLANTS OF CONCERN ON LONG ISLAND."
Scott is an environmental engineer in the Lake Services Section of New York State DEC. He is the invasive aquatic plant liaison and conducted field studies in Nassau County in 2005.
Location: Bill Paterson Nature Center
Muttontown Preserve, East Norwich

March 14, 2006* Tuesday, 7:30 p.m.
JERRY CARLSON: "EXOTIC PESTS AND PATHOGENS AS THREATS TO NEW YORK FORESTS."
Jerry is the DEC Chief of Forest Health and Protection for New York State. This program will cover insect pests and pathogens, such as Sudden Oak Death (SOD).
Location: Bill Paterson Nature Center
Muttontown Preserve, East Norwich

April 11, 2006* Tuesday, 7:30 p.m.
JOHN POTENTE:
"THE MARSHES OF LONG ISLAND."
A brief overview of the remaining Long Island marshlands. Attention will be paid to the troubles that beset them and attempts that are made to aid them. John is a board member of the Long Island Botanical Society, director of Native America, and currently sits on the Council of Environmental Quality, a legislative-appointed position within the Suffolk County Department of Planning.
Location: Bill Paterson Nature Center
Muttontown Preserve, East Norwich

* Refreshments and informal talk begin at 7:30 p.m.
Formal meeting starts at 8:00 p.m.

BOTANY

There should be no monotony
In studying your botany;
It helps to train
And spur the brain—
Unless you haven't gotany.

It teaches you, does Botany,
To know the plants and spotany,
And learn just why
They live or die—
In case you plant or potany.

You learn, from reading Botany,
Of wooly plants and cottony
That grow on earth,
And what they're worth,
And why some spots have notany.

You sketch the plants in Botany,
You learn to chart and plotany
Like corn or oats--
You jot down notes,
If you know how to jotany.

Your time, if you'll allotany,
Will teach you how and what any
Old plant or tree
Can do or be--
And that's the use of Botany!

Berton Braley
Science News Letter
March 9, 1929

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Margaret Conover
Long Island Botanical Society
PO Box 507
Aquebogue, NY 11931